Software User's Guide for

Common Operational Picture Sync Tool

Version 1.0.1.1 for GCCS Version 2.2

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COP Sync Tool Software User's Guide

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Section 1

What Is COP Sync Tool?

The Common Operational Picture (COP) Sync Tool is a segment developed for the Global Command and Control System (GCCS) Version 2.2, running Unified Build (UB) Version 3.0.1.6G. The COP Sync Tool segment provides MDXNet. The COP Sync Tool segment allows the near real-time exchange of track data between participating nodes on a wide area network (WAN).

The MDXNet exchanges the following types of data:

- Tracks:
  - -- Platform
  - -- ELINT
  - -- Acoustic
  - -- J-Units
  - -- Missile
  - -- Link
- Update messages
- SITREP messages
- Drop-track messages

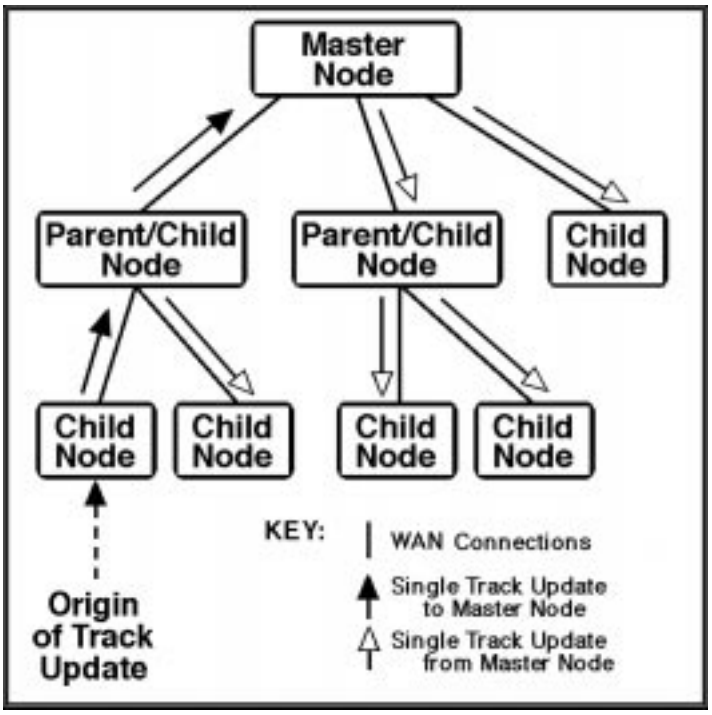
SITREP messages are intended to bring the local track picture up to date with other participants on the WAN. However, participating nodes do not send ambiguity tracks, local tracks, or terminal tracks to other participating nodes. When necessary, the MDXNet sends deletions of track data via drop-track messages.

This section provides an overview of the MDXNet architecture and a list of critical usage notes and cautions. Section 2 of this document explains how to install the COP Sync Tool segment, and Section 3 explains how to use it.

Architectural Overview

How does the MDXNet exchange data on a WAN? The answer is best represented by an inverted tree diagram (Figure 1-1), in which the child of one node may itself be the parent of another node. A parent or master node provides track data to its child nodes. Likewise, child nodes may also provide track data to their parent node, which then transmits that data to the other participating nodes. Figure 1-1 shows the data flow of a single track update from a child node to the other participating nodes on the WAN.

Figure 1-1 MDXNet Data Flow



As indicated in Figure 1-1, each child node can transmit a track update to one parent node only. In contrast, a master node or parent node can transmit a track update to multiple child nodes. Any master or parent node may provide track data to a maximum of five child nodes.

Participating nodes may also receive track data through other means such as radar inputs, link-11 data feeds, and satellites, and then share this track data with other participating nodes.

The MDXNet can also handle low-bandwidth network connections. Thus, a participating node that does not have a high data-rate network connection can still receive track data reliably, although the frequency and number of updates are reduced due to the low-bandwidth connection.

Upon the MDXNet start-up and on the hour and half-hour, child nodes automatically receive the most current track data via SITREP messages from their parent. These messages are intended to bring the child node up to date with the current MDXNet track picture held by the other participating nodes.

Critical Usage Notes and Cautions

1. **NOTE:** Track associations and disassociations may not be propagated to the other participating nodes in the COP until the next update occurs on the affected tracks.

2. **CAUTION:** In order to maintain a truly common operational picture among all participating nodes in the COP:

   a. All participating nodes must maintain the same track allocations within their local track databases. (These allocations are set by the local GCCS System Administrator using the Track Database Reconfig option on the Database menu.) If track allocations differ among the participating nodes, a common operational picture will not be fully maintained.

   b. A track association or disassociation should be performed only by the "owner" of a track. (You can ensure that you own a track by confirming that the system's UID matches the first three letters of the track's UID.)

   c. A track should only be Nu-Tracked by its owner.

   d. An ambiguity should never be Nu-Tracked.

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Section 2

How Do I Install It?

The COP Sync Tool segment allows a node to exchange and synchronize track data through the COP network. This segment installs the on-line version of this *COP Sync Tool Software User's Guide*, making it accessible from the COP Help System option on the GCCS Help menu.

The GPS_TIME segment is provided on a 4mm or 8mm tape by the Defense Information Systems Agency (DISA). A GCCS user with system administration (sysadmin) privileges must install the COP Sync Tool segment onto the GCCS workstation that will participate in the synchronized COP. The tape containing a segment must be physically inserted into a compatible device on either the local GCCS workstation or a remote machine accessible via network connection to the local GCCS workstation.

Installing the COP Sync Tool segment requires the use of the GCCS Segment Installer option. This option does the following:

- Identifies which applications / segments are loaded on the local workstation.
- Identifies which applications / segments are available on a tape or on a Segment Installation Server.
- Provides the capability to install and / or de-install applications / segments on the local workstation.

The Segment Installer installs segments in the /h file system on the local workstation. When this file system is approximately 80 percent full, the Segment Installer installs segments in /home1, followed by /home2, /home3, etc. The 80-percent constraint can be overridden on systems with limited disk space by using the Disk Space Override feature of the Segment Installer. In most cases, the segment installation process is automatic, requiring no further actions on the part of the user.

To install the COP Sync Tool segment:

> **NOTE**: It is highly recommended that the COP Sync Tool segment be installed first, followed by the COP_TIME_SYNC and GPS_TIME segments as required. The COP Sync Tool segment need only be loaded on *one* system in the LAN. For instance, if the COP Sync Tool segment is loaded on the Tdbm Master, it need not be loaded on any Tdbm slave machines.

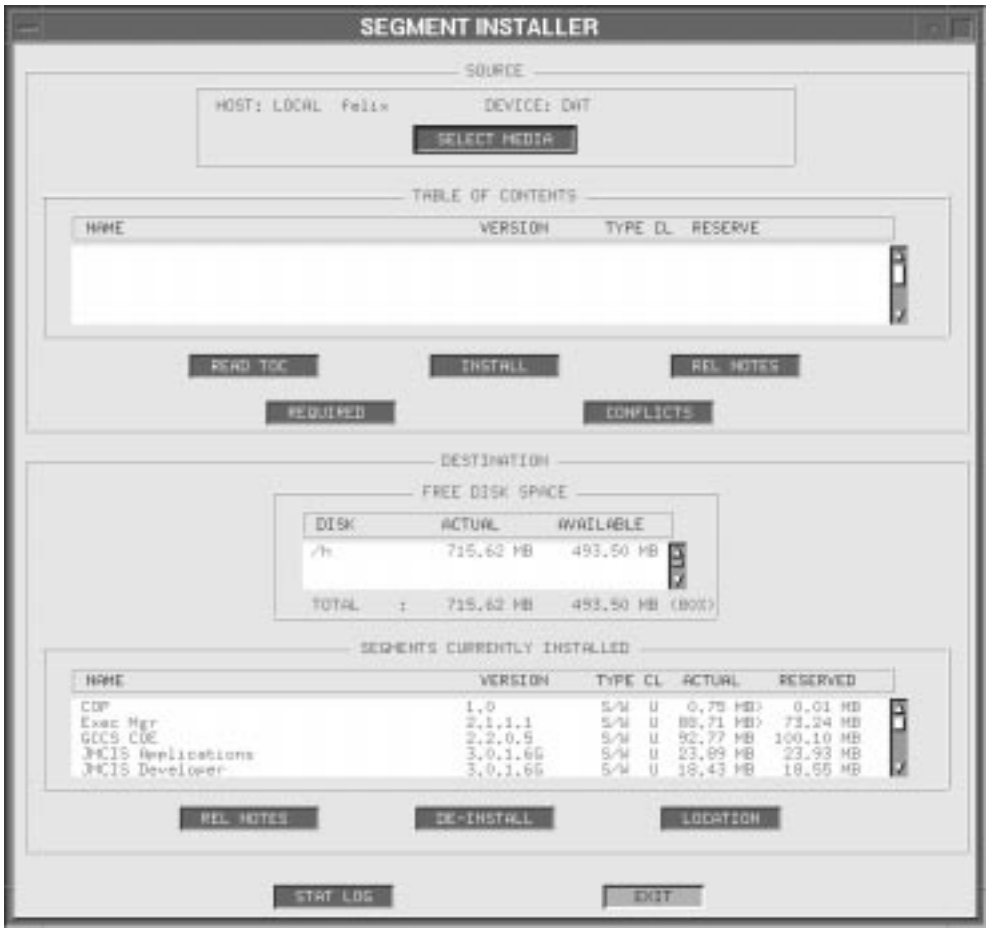
1. At the local GCCS workstation, log into GCCS as sysadmin, following your normal site procedures. The SYSTEM ADMINISTRATOR screen appears.

2. Insert the tape containing the COP Sync Tool segment into the appropriate tape drive (on either the local workstation or a remote machine) and wait until the control panel LEDs stop blinking.

3. From the Software menu on the local GCCS workstation, select Segment Installer. The System Processing Warning window appears, informing you that any active sessions on the system will be terminated. In order to use the Segment Installer option, you must terminate all active sessions. Please advise all other users who may be affected.

4. To terminate all active sessions, click OK. The SEGMENT INSTALLER window appears. For further instructions on how to use the SEGMENT INSTALLER window, see the *Unified Build 3.0.1.6G System Administrator's Guide.*

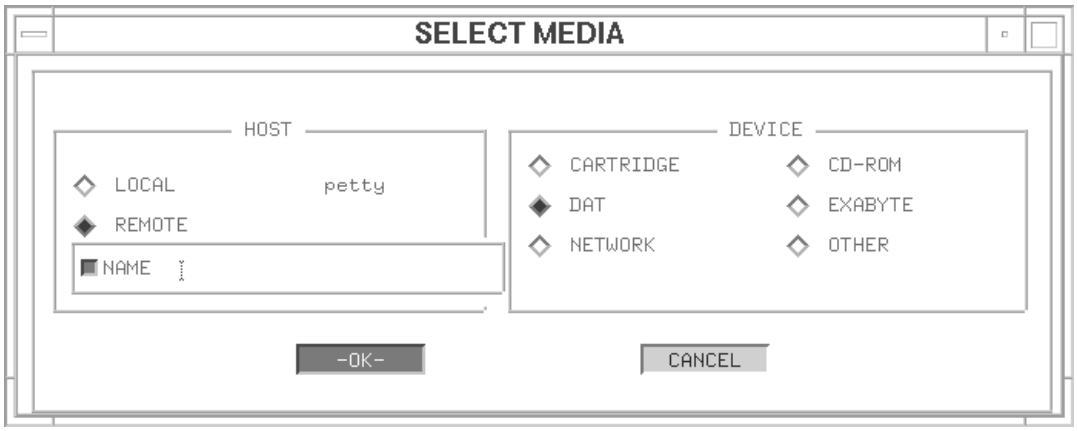
Figure 2-1 SEGMENT INSTALLER Window



If loading from a local device, proceed directly to Step 9. If loading from a remote or non-standard device, complete Steps 5 through 8 before proceeding to Step 9.

5. In the upper portion of the SOURCE box in the SEGMENT INSTALLER window, click SELECT MEDIA. The SELECT MEDIA window appears.

Figure 2-2 SELECT MEDIA Window



6. In the DEVICE box, select the media type of the segment tape (i.e., DAT or EXABYTE). (To manually enter the filename of the device, select OTHER and then enter the device name in the field that appears. **CAUTION**: It is highly recommended that only no-rewind devices be used.)

7. In the HOST box, select the location of the COP Sync Tool segment tape:

   a. If the segment tape is loaded on the local GCCS workstation, select LOCAL; then proceed to Step 8.

   b. If the segment tape is loaded on a remote machine, select REMOTE. A NAME field appears.

      - Click the button next to the NAME field to display a list of hosts available on the network.

      - From the list of available hosts, select the name of the remote host where the tape is loaded.

8. Click OK to return to the SEGMENT INSTALLER window.

9. Click READ TOC. The TABLE OF CONTENTS box displays a list of each software segment contained on the tape. This list contains the following column headings:

   NAME
   Name of the segment (e.g., COP Sync Tool segment).

   VERSION
   Version number of the segment.

TYPE
Type of the segment (e.g., S/W for software).

CL
Classification of the segment (e.g., U for UNCLASSIFIED).

RESERVED
Space reserved by the system on the local workstation in order for the segment to be installed.

10. From the list in the TABLE OF CONTENTS box, select the COP Sync Tool segment; then click INSTALL.

11. A warning window appears, asking if you want to clean the track tables on the local workstation. It is recommended that you clean the track tables at this point. Click OK to clean the track tables, or click CANCEL to exit the warning window without cleaning them. The Set Wan UID window appears.

12. Enter your machine UID (or use the default value given) and click OK. The Set Local Command window appears.

13. Enter your local command name (or use the default value given) and click OK. The Set OwnTrack Name window appears.

14. Enter your OwnTrack name and click OK. A window appears, displaying an hourglass, indicating that the system is busy installing the Cop Sync Tool segment.

15. When the installation is complete, a warning window appears, stating Selected Segment(s) Installed Successfully.

16. Click the EXIT button to dismiss the warning window and return to the SEGMENT INSTALLER window.

17. To enable communications with other COP nodes in the WAN, you must ensure *at a minimum* that your parent node and all child nodes are listed in the EDIT HOSTS window (which is displayed from the Network menu by selecting Edit Local Hosts). It is best to list *all* participating nodes in the EDIT HOSTS window.

Once you are finished installing the COP Sync Tool segment, you may want to install the GPS_TIME and / or the COP_TIME_SYNC segments. For installation instructions, see the *Software User's Guide for GPS_TIME* and / or the *Software User's Guide for COP_TIME_SYNC* depending on the role of your workstation in the synchronized COP.

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Section 3

How Do I Use It?

The following instructions explain how to:

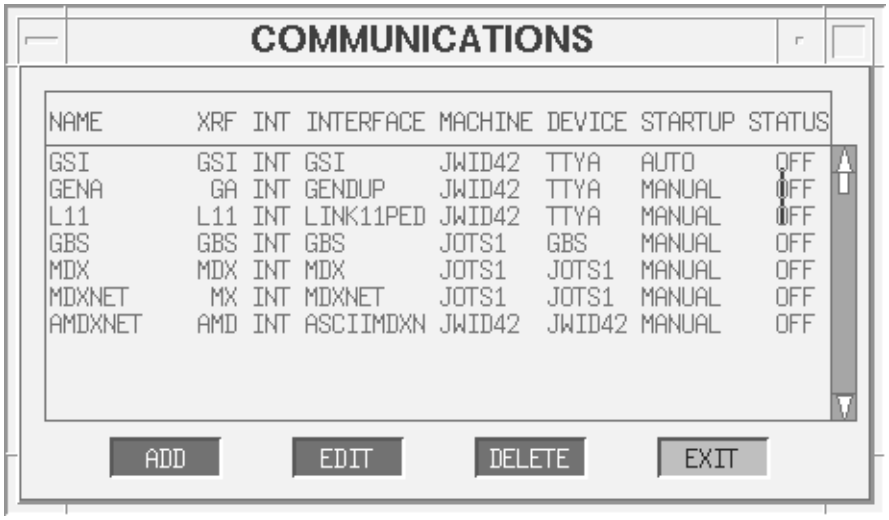
- Add an MDXNet channel.
- Configure an MDXNet channel.
- View a log of incoming COP SITREPs.

To perform any of these operations, first log into GCCS, following your normal site procedures; then refer to the applicable instructions that follow. Note that this entire *COP Sync Tool Software User's Guide* can be viewed on-line using the COP Help System option on the GCCS Help menu.

To add an MDXNet channel:

1. From the Comms menu, select Communications. The COMMUNICATIONS window appears.

Figure 3-1 COMMUNICATIONS Window



The COMMUNICATIONS window contains an entry under the following column headings for each channel in the database:

NAME
Unique channel name.

XREF
Unique three-character communications cross-reference code for the channel.

INT
Type of channel; either INT (internal channel) or EXT (external channel).

INTERFACE
Type of interface used by the channel.

MACHINE
Name of the machine used by the channel to transmit and receive messages; displays local hostname.

DEVICE
Name of the machine used by the channel to transmit and receive messages; displays parent hostname.

STARTUP
Type of start-up specified for the channel; either AUTO (channel is activated automatically upon system start-up) or MANUAL (channel must be activated manually using the START option, discussed below).

STATUS
Channel status; either ON or OFF.

The COMMUNICATIONS window also contains a pop-up menu providing the following options that can be applied to a channel in the database. To apply an option, first select the appropriate channel from the list in the window; then place the pointer anywhere within the window, click the rightmost mouse button, and select the desired option from the menu that appears.

CAUTION: Using the START, STOP, or RESTART option can cause messages that are enroute to be lost. Be careful when using these options. Do not turn channels on and off unnecessarily.

START
To activate a channel with a current STATUS of OFF.

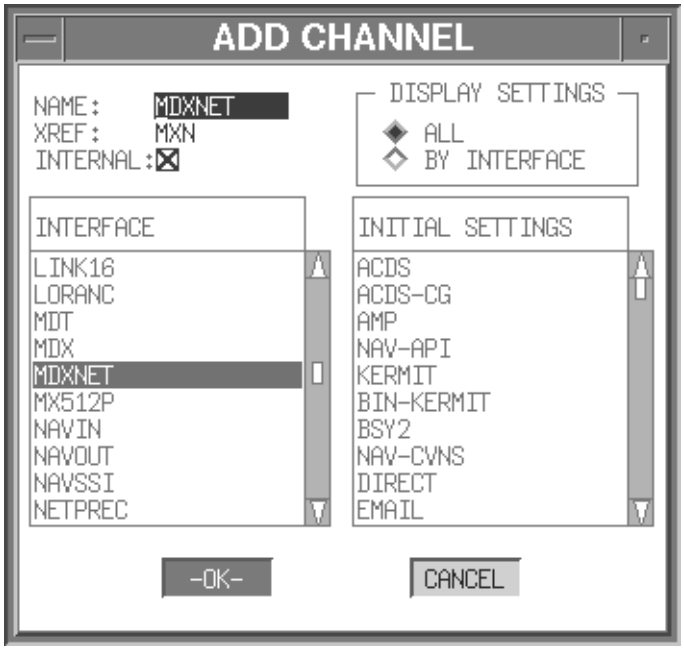
STOP
To de-activate a channel with a current STATUS of ON.

RESTART
To activate a channel, whether its current STATUS is ON or OFF.

WINDOW
To view raw data being received or transmitted over a channel.

2. In the COMMUNICATIONS window, click ADD. The ADD CHANNEL window appears.

Figure 3-2 ADD CHANNEL Window



3. In the NAME field, enter a name for the channel. Name is restricted to alphanumeric, underline (_), and hyphen (-) characters.

4. In the XREF field, enter the unique three-character communications cross-reference code for the channel.

5. Verify that the INTERNAL checkbox is selected.

6. In the DISPLAY SETTINGS box, verify that ALL is selected.

7. In the INTERFACE list, select MDXNET. The MDXNet interface automatically determines the selection in the INITIAL SETTINGS list.

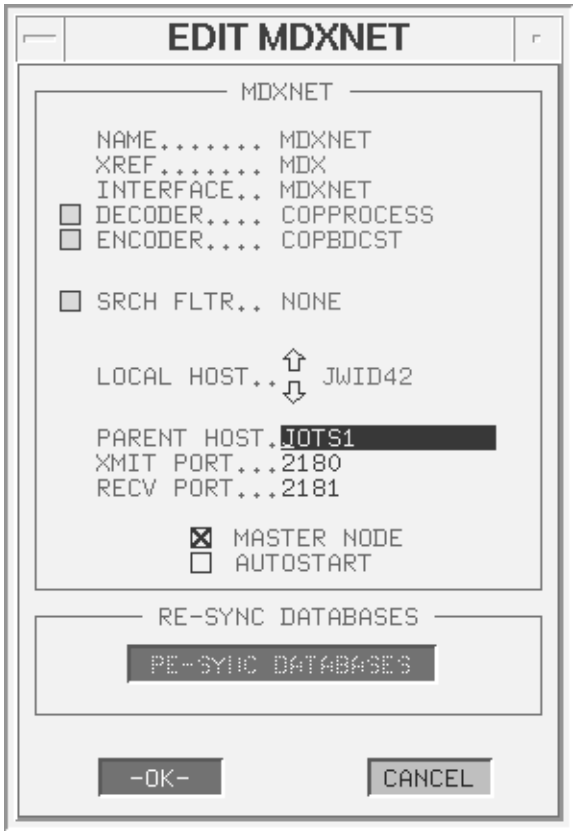
8. To create the MDXNet channel, click OK. The COMMUNICATIONS window appears, displaying an entry for the MDXNet channel.

To configure an MDXNet channel:

1. From the list of channels in the COMMUNICATIONS window (Figure 3-1), select the MDXNet channel and then click EDIT. The EDIT MDXNET window appears.

> **CAUTION**: If the MDXNet channel is activated (i.e., its current STATUS in the COMMUNICATIONS window is ON), making edits in the EDIT MDXNET window and then clicking OK will automatically de-activate the channel and restart it with the edited settings. This action can cause messages that are enroute to be lost.

Figure 3-3 EDIT MDXNET Window



2. Ensure that the entries in the NAME, XREF, and INTERFACE fields apply to the appropriate MDXNet channel.

3. Click the list box preceding the DECODER field to display a list of valid decoders; then select an entry from the list as follows:

   - COPPROCESS -- Allows the MDXNet channel to receive and decode incoming COP track data placed into the track database.

   - NONE -- Prevents the MDXNet channel from receiving and decoding COP track data.

4. Click the list box preceding the ENCODER field to display a list of valid encoders; then select an entry from the list as follows:

   - COPBDCST -- Allows the MDXNet channel to encode and transmit COP track data to other COP participants.

   - NONE -- Prevents the MDXNet channel from encoding and transmitting COP track data.

   CAUTION: It is highly recommended that the DECODER and ENCODER fields be set to COPPROCESS and COPBDCST, respectively. Setting either field to NONE may produce unexpected results, such as the channel not remaining activated or the system indicating that the channel is properly configured when it is not.

5. To select a search filter, click the list box preceding the SRCH FLTR field to display a list of valid search filters; then select an entry from the list. A search filter allows you to filter data that you transmit to other MDXNet sites.

   Note that you may use the Search Filter Table option on the GCCS Tracks menu to view the attributes of the available search filters and to add a search filter to the list. For a complete description of the Search Filter Table, see the *Unified Build User's Guide*.

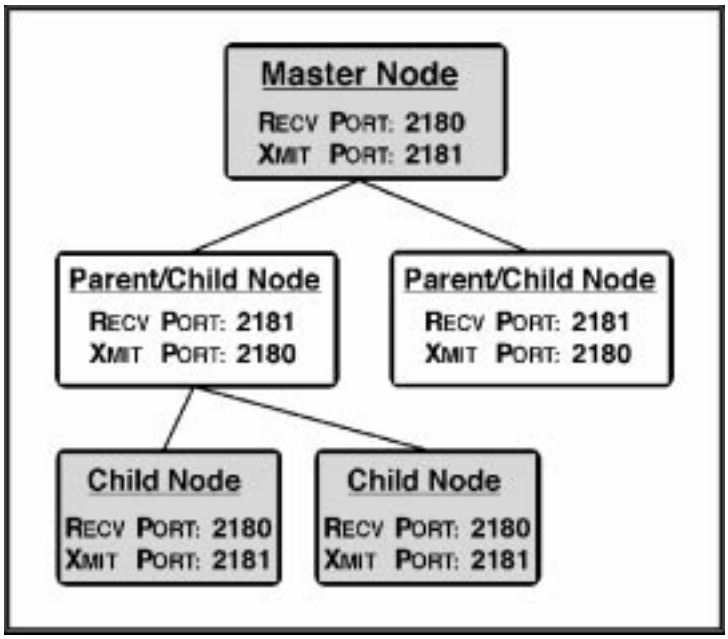
6. In the LOCAL HOST field, select the hostname of the machine running the MDXNet channel. (To display a list of valid hostnames, place the pointer in the LOCAL HOST field and click the rightmost mouse button.).

   NOTE: Your site's Standard Operating Procedures (SOPs) should document the role of your node as master, parent/child, or child, as represented by the inverted tree structure in Figure 3-4. The SOPs should also indicate your actual parent hostname and applicable port values, as represented by the example values in Figure 3-4.

7. In the PARENT HOST field, enter the hostname of the parent node of the local host. If your node is the master node, enter the same hostname entered in the LOCAL HOST field.

8. Based upon the role of your node in the synchronized COP, determine the values for its transmit (XMIT) and receive (RECV) ports. Also determine the values for its parent's XMIT and RECV ports.

Figure 3-4 Example MDXNet XMIT and RECV PORT Field Values



9. Enter a selection in the XMIT PORT field as follows:

   - If your parent's RECV PORT field contains 2180, enter 2181.
   - If your parent's RECV PORT field contains 2181, enter 2180.

10. Enter a selection in the RECV PORT field as follows:

    - If your parent's XMIT PORT field contains 2181, enter 2180.
    - If your parent's XMIT PORT field contains 2180, enter 2181.

11. Verify the setting of the MASTER NODE checkbox. Only the master node selects this checkbox. All other nodes should verify that this box is NOT selected.

12. To specify whether or not the MDXNet channel should be activated automatically upon COP start-up, select or de-select the AUTOSTART checkbox as desired.

13. (Optional) The purpose of the RE-SYNC DATABASES button is to initiate a SITREP from your node to your parent node to reconcile track databases. To reconcile your track database with the current track picture from the parent node, click the RE-SYNC DATABASES button. A warning window appears, informing you that this is a time-intensive process. Click OK to continue with the process, or click CANCEL to cancel it.

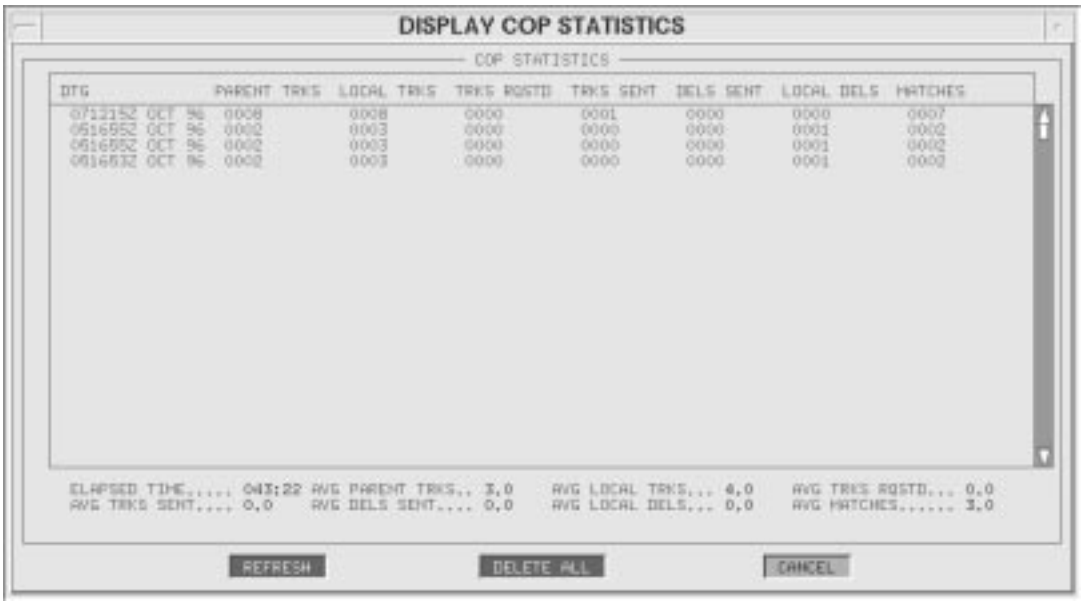
14. To save all changes made to the channel and return to the COMMUNICATIONS window, click OK. If the channel is activated, clicking OK automatically de-activates the channel and restarts it with the new settings.

To view a log of incoming COP SITREPs:

The DISPLAY COP STATISTICS window provides a log of all COP SITREPs *received* by your node. This log presents a statistical picture of the actions taken by a parent node and a child node to sync their databases. Database syncing is usually achieved through SITREPs, which normally flow from a parent node to a child node. However, database syncing can also occur when a child node sends a SITREP to its parent node through the manual re-sync process (as explained in the above instructions). In the definitions below, note that a parent node or a child node can be either an originator or a receiver of a SITREP.

1. From the Comms menu, select COP Statistics. The DISPLAY COP STATISTICS window appears.

Figure 3-5 DISPLAY COP STATISTICS Window



The DISPLAY COP STATISTICS window contains an entry under the following column headings for each SITREP in the log:

DTG
Date Time Group indicating when the receiving node received the SITREP. SITREPs are normally received every 30 minutes.

PARENT TRKS
Number of tracks held in the originating node's database at the indicated DTG.

LOCAL TRKS
Number of tracks held in the receiving node's database at the indicated DTG.

TRKS RQSTD
Number of tracks requested by the receiving node from the originating node.

TRKS SENT
Number of tracks sent by the receiving node to the originating node.

DELS SENT
Number of tracks that the receiving node requested the originating node to delete from the originating node's database.

LOCAL DELS
Number of tracks deleted from the receiving node's database.

MATCHES
Number of tracks that the originating node and receiving node have in common in their databases.

The DISPLAY COP STATISTICS window also conveys the following averages:

ELAPSED TIME
Total time (in minutes and seconds) since COP interface start-up.

AVG PARENT TRKS
Average number of originating node tracks (number of originating node tracks divided by number of SITREPs).

AVG LOCAL TRKS
Average number of local tracks (number of receiving node tracks divided by number of SITREPs).

AVG TRKS RQSTD
Average number of tracks requested (number of total tracks requested divided by number of SITREPs).

AVG TKS SENT
Average number of tracks sent (number of total tracks sent divided by number of SITREPs).

AVG DELS SENT
Average number of deletions sent (number of originating node track deletions divided by number of SITREPs).

AVG LOCAL DELS
Average number of local deletions performed (number of receiving node track deletions divided by number of SITREPs).

AVG MATCHES
Average number of matches (number of originating node and receiving node track matches divided by number of SITREPs).

2. To update the information in the window, click REFRESH.

3. To delete all SITREPs from the log, click DELETE ALL.

4. To exit the DISPLAY COP STATISTICS window, click CANCEL.

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